TECHNICAL SPECIFICATIONS

INDEX TO

TECHNICAL SPECIFICATIONS

LEWIS AND CLARK FAS BOAT RAMP REPLACEMENT

FWP# 7096727

SECTION 01010 - SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Owner and Contractor Responsibilities
B. Contractor use of site and premises.
C. Scope of Work

1.2 Owner and Contractor Responsibilities

A. Owners Responsibilities:
   1. Survey staking of boat ramp.

B. Contractors Responsibilities:

   1. Quality control of work.
   2. Coordination with FWP Engineer Kevin McDonnell

1.3 CONTRACTOR USE OF SITE

A. Limit use of site to allow:
   1. Coordinate with FWP to limit public usage in work areas as necessary.

1.3 SCOPE OF WORK

A. Project Objective:The objective of this project is to replace the existing boat ramp with a new cast-in-place ramp and push-in slab.

B. Scope of Work:

Work includes the following but is not limited to the general description contained herein:

BASE BID ITEMS:

1. Removal of existing boat ramp: All materials and work required to completely remove existing boat ramp and dispose of in a safe and legal manner.
2. Concrete Boat Ramp: All materials and work required to construct cast-in-place ramp per plans and specifications.
3. Concrete Push-in Slab: All materials and work required to construct push-in slab ramp per plans and specifications.

C. CONTRACTS:
All work shall be done under one general contract.

END OF SECTION

SECTION 01019 - CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Inspection and Testing Allowances
B. Application for Payment
C. Change procedures
D. Project Staking
E. Environmental Considerations

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment.
B. Section 01400 - Quality Control

1.3 INSPECTION AND TESTING ALLOWANCES

A. Testing costs paid for by Contractor:
   1. Costs of incidental labor and facilities required to assist inspection or testing firm.
   2. Costs of testing laboratory services required by Contract Document.
   3. Costs of retesting upon failure of previous tests as determined by Architect/Engineer.

1.4 APPLICATIONS FOR PAYMENT

A. Submit 1 copy of each application on Department Fish, Wildlife and Parks Form 101.

B. Content and Format: Utilize Schedule of Values on proposal form for listing items in Application for Payment.

C. Payment Period: 30 days.

1.5 CHANGE ORDER PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time.

B. The Engineer may issue a Change Directive, which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within 5 days.

C. The Contractor may propose changes by submitting a request for change to the Engineer describing the proposed change and its full effect on the Work. Include a statement

describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

D. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units, which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

1.6 PROJECT STAKING

A. Construction staking provided by the owner

1. Horizontal and vertical control point information will be provided.

2. If owners staking is destroyed through careless actions of the Contractor, the staking may be replaced by the owner and the cost of replacement deducted from the Contractor's contract.

B. Construction staking provided by the Contractor

1. All staking desired by the Contractor in addition to that noted above shall be provided by the Contractor.

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1.7 ENVIRONMENTAL CONSIDERATIONS

A. The Contractor shall use best management practices to prevent silt, soil and debris from entering the water. This may include straw, gravel or fabric. Temporary dikes to divert rainwater may be used, provided they are removed and the gravel or soil returned to the original condition. Exposed soil may require straw or similar cover to minimize erosion caused by rain. Other appropriate methods may be used at the Contractors' discretion or as directed by the owner.

B. Equipment used in or near water shall not leak fluids. It shall be power washed before use on the site and examined by the engineer.

END OF SECTION

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Measurement and payment criteria applicable to the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

1.2 AUTHORITY

A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the individual specification section shall govern.

B. Take all measurements and compute quantities. The Engineer will verify measurements and quantities.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.3 UNIT QUANTITIES SPECIFIED

A. Unit price quantities and measurements indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment. Lump sum bid item quantities will not be measured. Payment for these lump sum bid items will be per bid form.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

B. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PAYMENT

A. Payment Includes: Full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Architect/Engineer multiplied by the unit

sum/price for Work which is incorporated in or made necessary by the Work.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Engineer it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work will be repaired to the instructions of the Montana Department of Fish, Wildlife and Parks Engineer and the unit sum/price will be adjusted to a new sum/price at the discretion of the Montana Department of Fish, Wildlife and Parks Project Engineer.

2. The defective work will not be repaired. The Project Engineer will adjust the unit sum/price of the work to reflect the degree of defectiveness and subsequent serviceability.

C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.

D. The authority of the Montana Department of Fish, Wildlife and Park Project Engineer to assess the defect and identify payment adjustment, is final.

1.7 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:
1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling and disposing of rejected Products.

END SECTION

SECTION 01029

UTILITIES WITHIN WORK AREAS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Utilities within work areas.

B. Contractor's responsibilities.

1.2 UTILITIES WITHIN WORK AREAS

A. The contractor shall be responsible for determining the location of any utilities in the project area.
B. The contractor shall be responsible for working safely around any utilities that are located within the project area.

1.3 CONTRACTOR RESPONSIBILITIES

A. Notification: The Contractor shall contact, in writing, all public and private utility companies that may have utilities that may be encountered during excavation. The notification shall include the following information:

1. The nature of the work the Contractor will be performing.

2. The time, date, and location the Contractor will be performing work that may conflict with the utility.

3. The nature of work the utility will be required to perform such as moving a power pole, supporting a pole or underground cable, etc.

4. Requests for field location and identification of utilities.

B. Overhead Utilities: The Contractor shall use extreme caution to avoid a conflict, contact, or damage to overhead utilities such as power lines, telephone lines, television lines, poles, or other appurtenances during the course of construction of this project.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination.

B. Alteration project procedures.

C. Preconstruction conference.

1.2 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.

C. After Owner occupancy of site, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

D. Contractor will coordinate all work activities with the Montana Department of Fish, Wildlife and Parks Engineer Kevin McDonnell.

1.3 PRECONSTRUCTION CONFERENCE

A. Engineer will schedule a conference after Notice of Award is issued.

B. Attendance Required: Engineer, Contractor and the Regional Fish, Wildlife and Parks representative when possible.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.
5. Designation of personnel representing the parties in Contract, and the Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
7. Scheduling.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.
B. Construction progress schedules.
C. Proposed products list.
D. Product data.
E. Samples.
F. Manufacturers' instructions.
G. Manufacturers' certificates.
H. Construction photographs.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal to Project Manager no less than 15 days before product installation.
B. Apply Contractor's stamp, signature or initial certifying that review and verification of Products submitted, is in accordance with the requirements of the Work and Contract Documents.
C. Schedule submittals to expedite the Project.

D. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

E. Revise and resubmit submittals as required, identify all changes made since previous submittal.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule within 15 days after date established in Notice to Proceed for Project Manager's review.

1.4 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit complete list of major products/aggregates proposed for use, with name of manufacturer/supplier, trade name, and model number of each product.

C. 15 days prior to installation of surfacing aggregate materials, submit aggregate laboratory test analysis for the aggregate along with the name of the supplier.

C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.6 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance and control of installation.

B. References

C. Inspection and testing laboratory services.

1.2 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 REFERENCES

A. Conform to reference standard by date of issue current on January 1, 2005.

B. Should specified reference standards conflict with Contract Documents, or Regulations request clarification for Architect/Engineer before proceeding.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4 INSPECTION AND TESTING LABORATORY SERVICES

A. Contractor will appoint, employ, and pay for services of an independent firm to perform inspection and testing.

B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Architect/Engineer.

C. Reports will be submitted by the independent firm to the Architect/Engineer, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

D. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for retesting will be charged to the Contractor.

E. The Contractor shall deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.

F. The Contractor shall cooperate with laboratory personnel, and provide access to the work.

G. The Contractor shall provide incidental labor tools and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

H. The Contractor shall notify Architect/Engineer and laboratory 48 hours prior to expected time for operations requiring inspection and testing services.

I. The Contractor may arrange with laboratory and pay for additional samples and tests desired by Contractor beyond specified requirements.

OWNER

A. Engineer will perform periodic field inspections.

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A Selection and payment.

B Contractor submittals.

C Laboratory responsibilities.

D Laboratory reports.

E Limits on testing laboratory authority.

E Contractor responsibilities.

F Schedule of inspections and tests.

1.2. REFERENCES

A. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

1.3 SELECTION AND PAYMENT

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A. Contractor shall employ the services of an independent testing laboratory to perform specified inspection and testing, if required to do so by FWP Engineer. The testing agency will be approved by the FWP Engineer prior to testing. If the testing agency results indicate the material or work meets the related specifications, the cost of the testing will be paid by the Owner.

B. Employment of testing laboratory shall in no way relive Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.4 QUALITY ASSURANCE

A. Comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740.

B. Laboratory: Authorized to operate in state in which Project is located.

C. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.5 CONTRACTOR SUBMITTALS

A. Prior to testing, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards (NBS) during most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.6 LABORATORY RESPONSIBILITIES

A. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.

B. Ascertain compliance of materials and mixes with requirements of Contract Documents.

C. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

1.7 LABORATORY REPORTS

A. After each inspection and test, promptly submit two copies of laboratory report to Architect/Engineer, and to Contractor.

B. Include:

1. Date issued,
2. Project title and number,
3. Name of inspector,
4. Date and time of sampling or inspection,
5. Identification of product and Specifications Section,
6. Location in the Project,
7. Type of inspection or test,
8. Date of test,
9. Results of tests,
10. Conformance with Contract Documents.

C. Provide interpretation of test results to Engineer.

1.8 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop the Work.

1.9 CONTRACTOR RESPONSIBILITIES

A. Contract with an appropriate testing agency and make arrangements with the testing agency to perform the tests required in the contract documents.

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Weed Control.

B. Water Control.

C. Dust Control.

D. Erosion and Sediment Control

E. Pollution Control

F. Traffic Control

1.2 RELATED SECTIONS

A. Section 01010 - Summary of Work

B. Section 01039 - Coordination and Meetings

1.3 WEED CONTROL

A. Seed and reclaim disturbed areas as soon as possible.

B. Thoroughly clean equipment before bringing on site and notify Engineer for inspection.

1.4 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.5 DUST CONTROL

A. Contractor shall grade and compact materials as soon as possible after being placed.

1.6 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.7 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.8 TRAFFIC CONTROL

A. Provide all temporary signing, personnel and traffic control devises as required by federal, state and local regulations.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART I GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Substitutions.

1.2 PRODUCTS

A. Products: Means new material, components, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.3 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

D. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

E. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

1.5 SUBSTITUTIONS

A. Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the Substitution as for the specified product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.

3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

1.2 CLOSEOUT PROCEDURES

A. Notify the Engineer within 5 days of Work completion that Work is complete in accordance with Contract Documents and ready for Project Manager's final inspection.

B. Provide submittals to Engineer that are required by governing or other authorities or Owner.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. Include Certificate of Substantial Completion, Affidavit on Behalf of the Contractor, Consent of Surety Company to Final Payment and As-built drawings and specifications.

D. Owner will occupy all portions of the site.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean equipment and fixtures to a sanitary condition.

C. Clean site, rake clean landscaped areas, leave all disturbed areas relatively smooth with no wheel tracks, ridges or ruts.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work:

1. Contract Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other Modifications to the Contract.

5. Reviewed shop drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Field changes of dimension and detail.

3. Details not on original Contract drawings.

4. Product substitutions or alternates utilized.

5. Changes made by Addenda and Modifications.

F. Submit documents to Engineer with claim for final Application for Payment.

1.5 WARRANTIES

A. All work shall be warranted free from defect for a period of one year from final inspection date.

END OF SECTION

SECTION 02207

AGGREGATE MATERIALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. References
B. Submittals
(C. Aggregate materials and engineering fabric)
D. Source quality control
E. Stockpiling
F. Stockpile clean up

1.2 RELATED SECTIONS

A. Section 02211 - Rough Grading.
B. Section 02231 - Aggregate Courses.

1.3 REFERENCES

A. AASHTO - M147 - Materials for Aggregate and Soil-Aggregate.
B. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
C. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
E. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.4 SUBMITTALS

A. Submit laboratory test results for each type of aggregate material 15 days prior to installation, for Project Manager approval.

1. Each aggregate material used as a base or surfacing material shall have as a minimum the following laboratory tests completed:

I. Sieve Analysis

B. Materials Source: Submit name of imported materials suppliers. Provide materials from same source throughout the work. Change of source requires retesting at the Contractor's expense and Project Manager approval.

C. Change of source requires Engineer's approval.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS AND ENGINEERING FABRIC

A. Pit run base course, Grade 1, 3" (-) free of shale, clay, friable material and debris; graded in accordance with AASHTO T-11 and T-27, within the following limits:

TABLE OF GRADUATIONS

Percentage of Weights Passing Square Mesh Sieves

	Grade 1
3 Inch Sieve	100%
No. 4 Sieve	25-60%
No. 200 Sieve	7-14%

1. Material shall be evenly graded.

B. Crushed Base; free of silt, lumps of clay, loam, friable or soluble materials, and organic matter; graded in accordance with ANSI/ASTM C136; within the following limits:

TABLE OF GRADUATIONS
Percentage by Weights Passing Square Mesh Sieves

Passing	% Passing
1"	100 %
3/4"	
1/2"	
3/8"	
#4	40% - 70%
#10	25% - 55%
#16	
#30	
#50	
#100	
#200	5% - 12%

C. Drain Rock: Furnish drain aggregate that is round to subrounded aggregate meeting the following gradation requirements. Provide gradation report from certified laboratory.

PERCENTAGE OF GRADATIONS – DRAIN AGGREGATE

Percentage by Weight Passing Square Mesh Sieves	
Sieve Size	Percent Passing
3" (76 mm)	100
¾" (19 mm)	0-10
No. 4 (4.75 mm)	0-5

D. Engineering fabric

(1) Engineering fabric used, as a separation layer beneath the base course shall be Propex 200 or equivalent fabric rated for separation.

(2) Engineering fabric used as a drainage fabric in the drain rock filled ditches on either side of the ramp shall be Propex 200 or equivalent fabric rated for drainage.

(3) Substitution of fabrics other than called out will require submittal of manufacturers data sufficient to determine equivalence and suitability of product for contract use.

2.2 SOURCE QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01019.
B. Tests and analysis of aggregate material will be performed in accordance with AASHTO T-11 and T-27 and as specified in this Section.
C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 STOCKPILING

A. Stockpile materials on site at locations approved by Engineer.
B. Separate differing materials with dividers or stockpile apart to prevent mixing.
C. Stockpile in sufficient quantities to meet project schedule and requirements.
D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

END OF SECTION

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SECTION 02211

ROUGH GRADING

PART 1 GENERAL

1.1 SECTION INCLUDE

A. Removal of topsoil and subsoil.
B. Excavating, grading, filling and rough contouring the site for parking area construction.
C. Measurement and Payment

1.2 RELATED SECTIONS

A. Section 01410 - Testing Laboratory Services: Testing fill compaction.
B. Section 02110 - Site Clearing
C. Section 02207 - Aggregate Materials.

1.3 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils using a 10-lb (4.54 kg) Rammer and an 18-in. (457 mm) Drop.

B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

PART 2 EXECUTION

2.1 PREPARATION

A. Identify required lines, levels, contours, and datum. Boundary stakeout and elevations to be established by Engineer.

B. Stake and flag locations of known utilities.

C. Notify utility companies to locate buried utilities.

D. Locate, identify, and protect utilities that remain from damage.

2.2 SUBSOIL EXCAVATION

A. Excavate subsoil from marked areas.

B. Stockpile subpsoil in area approved by Engineer.

2.3 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Place fill materials on continuous layers and compact. See Section 02231

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Make grade changes gradual. Blend slope into level areas.

2.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed as necessary by the Engineer.

B. Compaction testing will be performed in accordance with ASTM D2922. If determined necessary by the Engineer.

C. Placement of base aggregate and subsequent concrete boat ramp shall not commence until Engineer has been notified and has had 48 hours to inspect rough grading.

2.4 MEASUREMENT AND PAYMENT

A. The Rough Grading described in Section 02210 shall be incidental to the Concrete Boat Ramp on the Bid Form.

END OF SECTION

SECTION 02231

AGGREGATE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate courses.

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment: Incidental to concrete..

1.3 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils using a 10lb (4.54 kg) Rammer and an 18 in. (457mm) Drop.

B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

C. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 PRODUCTS

2.1 SURFACING MATERIALS

A. 3”(-) Base Course: As specified in Section 02207
B. Drain Rock : As specified in Section 02207

PART 3 EXECUTION

3.1 AGGREGATE PLACEMENT

A. Spread material over prepared substrate to a total compacted thickness indicated for each material.

B. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

C. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.2 TOLERANCES

A. Flatness: Maximum variation of 1/10 foot in 10 feet measured along existing slope.

B. Scheduled Compacted Thickness: Within 1/4 inch of designated thickness.

C. If tests indicate Work does not meet specified requirements, Project Manager may at his discretion direct the Contractor to rework the material and retest or remove work, replace and retest.

3.3 FIELD QUALITY CONTROL

A. Contractor will be responsible for field quality control.

B. Compaction testing will be performed in accordance with ASTM D2922.

C. If tests indicate Work does not meet specified requirements, recompact and retest or at Engineer's discretion, remove Work, replace and retest.

3.4 MEASUREMENT AND PAYMENT

A. The Aggregate Courses described in Section 02231 shall be incidental to the Concrete Boat Ramp on the Bid Form.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Form accessories.

C. Form stripping.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 03300 - Cast-In-Place Concrete: Supply of concrete accessories for placement by this section.

1.3 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

B. Section 03300 - Cast-in-Place Concrete.

1.4 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ACI 347 - Recommended Practice For Concrete Formwork.

D. PS 1 - Construction and Industrial Plywood.

1.5 DESIGN REQUIREMENTS

A. Construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for fabrication, erection and removal of formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.2 FORMWORK ACCESSORIES

A. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture.

B. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Earth forms are not permitted.

3.3 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping.

D. Align joints and make watertight. Keep form joints to a minimum.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated with form release agent prior to placement of concrete.

3.5 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by Section 03300 - Cast-in-Place Concrete.

3.4 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with design, and that supports, fastenings, wedges, ties, and items are secure.

B. Notify Engineer 72 hours prior to concrete placement for inspection of formwork and rebar reinforcement installation.

3.5 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel, fibermesh and accessories for cast-in-place concrete.

1.2 RELATED SECTIONS

A. Section 03100 - Concrete Formwork.

B. Section 03300 - Cast-in-Place Concrete.

1.3 REFERENCES

A. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.

B. CRSI 63 - Recommended Practice For Placing Reinforcing Bars.

C. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice.

1.5 COORDINATION

A. Coordinate work under provisions of Section 01039.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615 or ASTM A 617/A 617M, Grade 40. Place as shown on the plans.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice.

B. Locate reinforcing splices not indicated on drawings, at point of minimum stress, according to ACI 301. Review location of splices with Engineer.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Maintain concrete cover around reinforcing as follows:

C.

Item	Coverage
Footings and Concrete Formed Against Earth	3 inches

3.2 FIELD QUALITY CONTROL

A. Field inspection shall be performed by the Engineer.

B. Notify Engineer 72 hours prior to placement of concrete inform for form work and rebar inspection.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Control, expansion and contraction joint devices associated with concrete work.

1.2 RELATED SECTIONS

A. Section 03100 - Concrete Formwork: Formwork and accessories.

B. Section 03200 - Concrete Reinforcement: Reinforcement

1.3 MEASUREMENT AND PAYMENT

A. Concrete:

1. Basis of Measurement: Not measured.

2. Basis of Payment: Unit Cost Payment includes grading, formwork, steel reinforcement, concrete, placement accessories, consolidating and leveling, troweling, finishing, curing, drain rock and filter fabric.

1.4 REFERENCES

A ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

B. ACI 305R - Hot Weather Concreting.

C. ACI 306R - Cold Weather Concreting.

D. ACI 308 - Standard Practice for Curing Concrete.

E. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

F. ASTM C33 - Concrete Aggregates.

G. ASTM C94 - Ready-Mixed Concrete.

H. ASTM C150 - Portland Cement.

I. ASTM C260 - Air Entraining Admixtures for Concrete.

J. ASTM C494 - Chemicals Admixtures for Concrete.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type IA - Air Entraining - Portland type.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

D. Micromesh reinforcement shall be fibrillate polypropylene olefin fibermesh.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260.

2.3 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type B ASTM D1752; Closed cell polyvinyl chloride foam, resiliency recovery of 95 percent if not compressed more than 50 percent of original thickness. It shall be equal to Rodofoam grade #327 as manufactured by W.R. Grace & Company.

2.4 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C94, Alternative No. 3.

B. Select proportions for normal weight concrete in accordance with ACI 301 Method 3.

C. Provide concrete to the following criteria:

Unit	Measurement
Compressive Strength (7 day)	2000 psi
Compressive Strength (28 day)	4000 psi
Water/Cement Ratio (maximum)	6 gal/bag
Aggregate Size (minimum)	3/4 inch
Air Entrained	3 - 6 percent
Slump (maximum)	3 - 4 inches

D. Use accelerating admixtures in cold weather only when approved by Engineer. Use of admixtures will not relax cold weather placement requirements.

E. Use set retarding admixtures during hot weather only when approved by Engineer.

F. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

G. Use of calcium chloride as an admixture is prohibited!

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that reinforcement and other items to be cast into concrete are accurately placed, positioned securely.

B. Verify requirements for concrete cover over reinforcement.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify Engineer minimum 72 hours prior to commencement of operations. The forms and steel reinforcement shall be inspected by the Engineer before concrete may be placed.

C. Ensure reinforcement, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. The contractor shall not allow cold joints to occur within continuous sections of concrete.

F. Tolerance:
   1. Horizontal alignments on all work shall be such that the concrete serves the function intended and presents a clean, even, regular appearance. Lines intended to be straight shall be within a tolerance of plus or minus 2 inches in 100 feet.

   2. Elevation shall be plus or minus .05 feet of staked elevation.

3.4 CONCRETE FINISHING

A. Provide a grooved finish on the boat ramp. The tool used for producing the finish will be provided by FWP. The tools provided by FWP shall be returned cleaned. The finishing surfaces shall be free of hardened concrete and in good condition. A cleaning cost of $250.00 will be retained if the tools are returned uncleaned or poorly cleaned. Additional costs for repair or replacement of damaged tools may also be retained.

B. All exposed edges shall receive a one inch chamfer.

C. All tooled joints shall have a ½ inch chamfer.

D. Sawcut joints across the slab within 24 hours of pouring to a depth of 2" and at a maximum spacing of 15'.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Concrete placed during cold weather shall be protected in accordance with ACI 306R - Cold Weather Concreting.

3.6 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed by the Engineer.

B. Contact engineer 72 hours prior to placement of concrete in forms.

C. Provide free access to Work and cooperate with testing firm.

D. Submit proposed mix design of concrete to the Engineer for review 72 hours prior to commencement of Work.

E. Tests of cement and aggregates may be performed at the Engineers direction to ensure conformance with specified requirements.

3.7 PATCHING

A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

C. Patch imperfections as directed.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. The repair or replacement of defective concrete will be determined by the Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION